001012

BULLETIN

OF THE

GEOLOGICAL SOCIETY

OF

AMERICA

VOL. 22

JOSEPH STANLEY-BROWN, *Editor*

PUBLIC LIBRARY,
OCT 30 1912
DETROIT, MICH.

NEW YORK
PUBLISHED BY THE SOCIETY
1911

OFFICERS FOR 1911

W. M. DAVIS, *President*

WILLIAM NORTH RICE, } *Vice-Presidents*
WILLIAM B. SCOTT, }

EDMUND OTIS HOVEY, *Secretary*

WILLIAM BULLOCK CLARK, *Treasurer*

JOSEPH STANLEY-BROWN, *Editor*

HENRY P. CUSHING, *Librarian*

Class of 1913
A. H. PURDUE,
HEINRICH RIES,
Class of 1912
J. B. WOODWORTH,
C. S. PROSSER,
Class of 1911
GEORGE OTIS SMITH,
HENRY S. WASHINGTON,
} *Councilors*

PRINTERS
JUDD & DETWEILER (INC.), WASHINGTON, D. C.

ENGRAVERS
THE MAURICE JOYCE ENGRAVING COMPANY, WASHINGTON, D. C.

1337
8853

CONTENTS

Page

Proceedings of the Twenty-third Annual Meeting of the Geological Society of America, held at Pittsburgh, Pennsylvania, December 27, 28, and 29, 1910; EDMUND OTIS HOVEY, *Secretary* 1
Session of Tuesday, December 27 2
Election of Auditing Committee 2
Election of officers 2
Election of Fellows 3
Election of correspondents 3
Memoir of J. C. K. Laflamme (with bibliography); by JOHN M. CLARKE 4
Memoir of William Harmon Niles; by GEORGE H. BARTON 8
Memoir of David Pearce Penhallow (with bibliography); by ALFRED E. BARLOW 15
Memoir of William George Tight (with bibliography); by J. A. BOWNOCKER 19
Memoir of Robert Parr Whitfield (with bibliography by L. Hussakof); by JOHN M. CLARKE 22
Memoir of Thomas C. Weston (with bibliography); by ROBERT BELL 32
Memoir of Wm. Phipps Blake (with bibliography); by R. W. RAYMOND. 36
Memoir of Franklin R. Carpenter (with bibliography); by H. O. HOFMAN 48
Report of the Photograph Committee 52
Report of Geological Nomenclature Committee 52
Amendment to the By-Laws 52
Resolution concerning freight rates 53
Titles of papers and names of disputants 54
Address of the retiring President 55
Session of Wednesday, December 28 56
Report of the Council 56
Secretary's report 56
Treasurer's report 58
Editor's report 60
Report of the Auditing Committee 62
Resolution concerning Canadian Forestry School 62
Report of delegates to the International Geologic Congress 62
Titles of papers and names of disputants 62
Annual dinner 64
Session of Thursday, December 29 65
Program of glacial and physiographic section 65
Program of the petrologic, mineralogic, and economic section 67
Register of the Pittsburgh Meeting, 1910 69
Officers, Correspondents, and Fellows of the Geological Society of America. 71
Proceedings of the Second Annual Meeting of the Paleontological Society, held at Pittsburgh, Pennsylvania, December 28-29, 1910; R. S. BASSLER, *Secretary* 85
Session of Wednesday, December 28 85
Report of the Secretary 85
Report of the Treasurer 89
Election of officers, correspondents, and members 89
Resolution concerning zoological nomenclature 90

Page

Resolution concerning freight classification 91
Memorial addresses 91
Titles of papers on paleobotany and names of disputants 91
Address of retiring President 92
Titles of papers on invertebrate paleontology and names of disputants 92
Session of Thursday, December 29 92
Titles of conference papers and names of disputants 93
Titles of papers on vertebrate paleontology and names of disputants 94
Titles of papers on invertebrate and general paleontology and names of disputants 95
Register of the Pittsburgh meeting, 1910 96
Officers and members of the Paleontological Society 97
Origin of the thermal waters in the Yellowstone National Park; by ARNOLD HAGUE 103
Repeating patterns in the relief and in the structure of land; by W. H. HOBBS. 123
Preglacial course of the upper Hudson River; by WILLIAM J. MILLER 177
Aggraded limestone plains of the interior of Bahia and the climatic changes suggested by them; by J. C. BRANNER. 187
Aftonian Mammalian Fauna II; by SAMUEL CALVIN 207
Conference of the faunal criteria in Paleozoic Paleogeography; R. S. BASSLER, *Secretary* 217
Introduction 217
Nature of Tertiary and modern marine faunal barriers and currents; by WILLIAM H. DALL 218
Value of floral evidence in marine strata as indicative of nearness of shores; by DAVID WHITE 221
Are the fossils of the dolomites indicative of shallow, highly saline and warm water seas? by STUART WELLER 227
Stratigraphic significance of the wide distribution of graptolites; by RUDOLF RUEDEMANN 231
Physical conditions under which Paleozoic coral reefs were formed; by T. WAYLAND VAUGHAN 238
Bearing of the Paleozoic Bryozoa on paleogeography; by E. O. ULRICH .. 252
Paleogeographic and geologic significance of recent Brachiopoda; by CHARLES SCHUCHERT 258
Stratigraphic significance of Ostracoda; by R. S. BASSLER. 275
Relation of the Paleozoic Arthropods to the strand line; by JOHN M. CLARKE 279
Revision of the Paleozoic systems; by E. O. ULRICH 281
Cirques and rock-cut terraces of Mount Toby; by B. K. EMERSON 681
Mid-continental eolation; by CHARLES R. KEYES 687
Abstracts of papers presented at the Twenty-third Annual Meeting of the Society, but not published in full in the preceding pages of this volume, together with discussions of papers as far as preserved; E. O. HOVEY, *Secretary* 715
List of underground temperatures in the United States [abstract]; by N. H. DARTON 716
Unusual distortion of the Lower Kittanning coal [abstract]; by RICHARD R. HICE 716

Page

Further evidence of an unconformity in the so-called Laramie of the Raton coal field, New Mexico [abstract]; by WILLIS THOMAS LEE.. 717

Repeating patterns in the relief and in the structure of the land [discussion]; by WILLIAM HERBERT HOBBS..... 717

Apparent sun-crack structure in diabase [abstract and discussion]; by EDGAR T. WHERRY..... 718

Geology of part of Luna County, New Mexico [abstract]; by N. H. DARTON 718

Pre-Cambrian of Sweden, with comments on American taxonomic parallels [abstract and discussion]; by JAMES F. KEMP..... 719

Chazy formation in the Ottawa Valley [abstract]; by P. E. RAYMOND. 719

Frankfort and Utica shales of the Mohawk Valley [abstract]; by RUDOLF RUEDEMANN 720

Stratigraphy of the Lower Pennsylvanian of northeastern Oklahoma [abstract and discussion]; by D. W. OHERN..... 720

Sketch of the local geology, city of Pittsburgh [abstract and discussion]; by PERCY E. RAYMOND..... 721

Cretaceous and Tertiary formations of western North Dakota and eastern Montana [abstract]; by A. G. LEONARD..... 722

Eocene and Oligocene of the Wind River and Big Horn basins [abstract and discussion]; by W. J. SINCLAIR and WALTER GRANGER... 722

Twenty-foot terrace and sea-cliff of the Lower Saint Lawrence [abstract and discussion]; by JAMES WALTER GOLDTHWAIT..... 723

Pre-Glacial course of the upper Hudson River [discussion]; by WILLIAM J. MILLER..... 724

Mohawk glacial lobe [abstract and discussion]; by A. P. BRIGHAM... 725

Lake Maumee, in Ohio [abstract and discussion]; by FRANK CARNEY. 726

Study of ice-sheet erosion and deposition in the region of the Great Lakes [abstract and discussion]; by FRANK BURSLEY TAYLOR..... 727

Iowan drift [abstract]; by SAMUEL CALVIN..... 729

Pleistocene of the vicinity of Sioux Falls, South Dakota [abstract]; by B. SHIMEK..... 730

Pleistocene of the vicinity of Omaha, Nebraska, and Council Bluffs, Iowa [abstract]; by B. SHIMEK..... 730

Lessons of the Little Yosemite Valley [abstract]; by F. E. MATTHES. 730

Two glaciers in Alaska [abstract and discussion]; by L. MARTIN..... 731

System of Quaternary lakes in the Mississippi basin [abstract and discussion]; by E. W. SHAW..... 732

Radiation of glacial flow as a factor in drumlin formation [abstract and discussion]; by WILLIAM C. ALDEN..... 733

New method of calculating the date of the Glacial epoch [abstract]; by RUFUS M. BAGG, JR..... 735

Physiographic studies in the San Juan District of Colorado [abstract and discussion]; by WALLACE W. ATWOOD..... 735

Geographical descriptions in the folios of the Geologic Atlas of the United States [abstract]; by W. M. DAVIS..... 736

Quantitative classification of meteorites [abstract]; by OLIVER C. FARRINGTON 736

Moldavite question [abstract]; by GEORGE P. MERRILL..... 736

Clinton sand as a source of oil in Ohio [abstract and discussion]; by J. A. BOWNOCKER..... 736

Page

Geological relations of oil pools situated in regions of monoclinal structure [abstract and discussion]; by FREDERICK G. CLAPP..... 737
Geology of the Chibougamau region, Quebec, Canada [abstract]; by ALFRED ERNEST BARLOW..... 738
Occurrence of silver, copper, and lead ores at the Veta Rica mine, Sierra Mojada, Coahuila, Mexico [abstract]; by F. R. VAN HORN... 738
Index to volume 22..... 739

ILLUSTRATIONS

PLATES

Plate 1—CLARKE: Portrait of J. C. K. Laflamme..... 4
" 2—BARLOW: Portrait of David P. Penhallow..... 15
" 3—BOWNOCKER: Portrait of William G. Tight..... 19
" 4—CLARKE: Portrait of Robert P. Whitfield..... 22
" 5—BELL: Portrait of Thomas C. Weston..... 32
" 6—RAYMOND: Portrait of William P. Blake..... 36
" 7—HOBBS: Repeating patterns in landscapes..... 128
" 8 " Rock structure becoming impressed upon the relief through frost action..... 129
" 9 " Checkerboard topography..... 131
" 10 " Relief forms controlled by the fracture system..... 138
" 11 " Control of direction of waterways in humid regions of moderate latitudes..... 139
" 12 " Rectangular fracture and relief patterns..... 159
" 13 " An example and a model of a fracture pattern..... 172
" 14—BRANNER: Limestone areas of the interior of Bahia, Brazil..... 187
" 15 " Catinga limestone and travertine barrier..... 192
" 16 " Channel of Rio Salitre and cliff of lime rock..... 193
" 17 " Catinga limestone exposures..... 200
" 18—CALVIN: Aftonian fossils..... 216
" 19 " Aftonian fossils..... 216
" 20 " Aftonian fossils..... 216
" 21 " Aftonian fossils..... 216
" 22 " Aftonian fossils..... 216
" 23 " Aftonian fossils..... 216
" 24 " Aftonian fossils..... 216
" 25—ULRICH: Map of southern Appalachian Valley..... 281
" 26 " Development of geological column and of stratigraphic nomenclature from 1837 to 1911..... 376
" 27 " Correlation Table I..... 608
" 28 " Correlation Table II..... 608
" 29 " Correlation Table III..... 608
" 30—EMERSON: Relief map of Mount Toby and view of Hanging valley indicated thereon..... 681
" 31 " Hanging valley and vertical scarp: Mount Toby..... 682

FIGURES

HOBBS:
Figure 1—Typical fault topography..... 125
" 2—Typical fold topography..... 126
" 3—Some lines of profile each characteristic of a specal type of landscape..... 127

HOBBS: Page

Figure 4—Illustrations from the Norwegian coast ... 128
" 5—Effect of frost work ... 129
" 6—Subdivision of the Norwegian cost region ... 130
" 7—Kjerulf's map of the fracture system of Norway ... 132
" 8—Small relief unit determined by individual and consecutive joints ... 133
" 9—Embrasure-like notching of the coastline of west Greenland. 134
" 10—Normal drainage network above homogeneous rock devoid of structure planes ... 134
" 11—Illustration of structural control of network ... 134
" 12—Rain-sculpturing controlled by joints ... 135
" 13—Drainage map of the Redfield Quadrangle, South Dakota ... 136
" 14—Botoka gorge of the Zambesi River ... 137
" 15—Sagging of beds of thin, flaggy limestone over joints ... 138
" 16—Map of the vicinity of the Moldefjord in western Norway ... 139
" 17—Map of the vicinity of Bergen, Norway ... 140
" 18—Schematic representation of the merging of two relief patterns ... 141
" 19—Fractured relief patterns locally obscured by dominance of fold structures ... 142
" 20—Schematic diagram indicating the composite expression of a lineament ... 143
" 21—Map of the Abisko Canyon in northern Lapland ... 145
" 22—Sand cones aligned along a fissure ... 146
" 23—Fracture patterns ... 147
" 24—Drainage map of the area about Rockland, in northern Michigan ... 149
" 25—Drainage map of a part of the district of Nipissing ... 150
" 26—Map showing oriented drainage of the French River district, Ontario ... 151
" 27—Patterned drainage of the Shepaug Valley, Connecticut ... 153
" 28—Map of the Tehachapi Valley ... 154
" 29—Outline map of the fracture system of the Pomperaug Valley, Connecticut ... 156
" 30—Schematic representation of the relations of the disorderly to the regularly patterned fracture fields of central North America ... 157
" 31—Oriented drainage network of the vicinity of Charny, in France ... 158
" 32—Fault system in the Silurian basin of central Bohemia ... 159
" 33—View of the Pordoi-Gebirge (Sella group) in the Dolomites. 160
" 34—Drainage network of the Dolomites ... 161
" 35—Oriented drainage of the Idrea river ... 162
" 36—Oriented drainage and structure lines of east central Africa ... 163
" 37—Diagram illustrating the progressive landward shifting of strand lines with uplift due to excessive depression on the ocean floor ... 164
" 38—Slope of the eastern twin of Orenaug Hill ... 168
" 39—Effect of faults in displacing a basalt flow ... 169
" 40—Fault blocks represented by outcrops of the upper basalt flow in the Pomeraug Valley, Connecticut ... 170

HOBBS: Page

Figure 41—Details of faulting along front of basalt cliff shown at *a a* in figure 40 171
" 42—Floating block topography of the Orenaug Hills, near Woodbury, Connecticut 172
" 43—Map of the Chedrang fault 173
" 44—Changes of throw measured on the course of a fault near the shore of Russell fjord, Alaska 174

MILLER:

Figure 1—Sketch map of the southeastern Adirondack region 178

BRANNER:

Figure 1—People of the Sao Francisco Railway 201
" 2—Generalized northeast-southwest section, showing the limestones as the surface rocks between Joazeiro and Rio Salitre. 202

ULRICH:

Figure 1—Sketch map of southeastern North America 293
" 2—Illustrations of marginal erosion. 312
" 3—The Chambersburg limestone 324
" 4—Diagram illustrating (*A*) fluctuation and oscillation of average relief of median areas of North America with respect to sealevel, and (*B*) relative vertical displacement of the strandline in successive periods with respect to an assumed average sealevel 343
" 5—Diagrams illustrating gulf and boreal invasions 346
" 6—Diagrams illustrating Pacific and Atlantic invasions 347
" 7—Map of North America, showing interlapping late Black River and early Trenton invasions from the Arctic, Atlantic, Gulf of Mexico, and Pacific sides 368
" 8—Schematic sections of North America from the Arctic Sea to the mouth of the Mississippi River 407
" 9—Sketch giving an approximate idea of the southern Appalachian troughs at close of Telico sandstone sedimentation. 414
" 10—Section showing east-west oscillation of the Adirondack uplift and consequent differences in the sedimentary sequence on these two sides 414
" 11—Diagrams showing variations in distribution of sediments between and on the flanks of the domes of the Cincinnati geanticline 417
" 12—Diagram showing sections of embayments in southern flank of Ozarkia, containing Canadian, Ordovician, and Silurian deposits 421
" 13—Geologic map of north-central part of Florida 431
" 14—Diagram illustrating tilting 432
" 15—Diagram illustrating hypothesis of origin and location of normal faults thought to have been caused by relief from streases which developed through loading of negative areas. 433
" 16—Inland migration of belts of folding in southeastern North America 440
" 17—Diagrams illustrating overlaps and unconformities 450
" 18—Diagrams illustrating the stratigraphic relations of the Yellville, Everton, and Joachim formations to the Saint Peter sandstone and the northward overlap of the last 480
" 19—Map of portion of land hemisphere 484

PUBLICATIONS OF THE GEOLOGICAL SOCIETY OF AMERICA

Regular Publications

The Society issues annually a single serial octavo publication entitled Bulletin of the Geological Society of America, the edition being 555 copies. The first twenty volumes of this serial consist of *proceedings* and *memoir brochures*, the former containing the records of meetings, with abstracts and short papers, list of Fellows, etcetera, and the latter embracing larger papers accepted for publication. Beginning with volume 21 the method of issuing the Bulletin was changed to four parts per year, at intervals of three months each. A small supply of authors' separates of the longer articles will be kept for sale by the Secretary.

The Bulletin is sold at the following prices: To Fellows, institutions, libraries, and persons residing outside of North America, seven dollars and fifty cents ($7.50) per volume; to persons in North America not Fellows of the Society, ten dollars ($10.00) per volume (the same amount as the annual dues of the Fellows). These prices cover cost of transmission to all parts of the globe. No reduction is made to dealers. Orders should be addressed to the Secretary, whose address is care of the American Museum of Natural History, New York, N. Y., and drafts and money orders should be made payable to *The Geological Society of America.*

Description of the Published Volumes.

Volumes.	Pages.	Plates.	Figures.	Price to Fellows.
Vol. 1, 1899	593 + xii	13	51	$7.50
Vol. 2, 1890	622 + xiv	23	63	7.50
Vol. 3, 1891	541 + xi	17	72	7.50
Vol. 4, 1892	458 + xi	10	55	7.50
Vol. 5, 1893	655 + xii	21	43	7.50
Vol. 6, 1894	528 + x	27	40	7.50
Vol. 7, 1895	558 + x	24	61	7.50
Vol. 8, 1896	446 + x	51	29	7.50
Vol. 9, 1897	460 + x	29	49	7.50
Vol. 10, 1898	534 + xii	54	83	7.50
Index to volumes 1–10	209	..	..	2.25
Vol. 11, 1899	651 + xii	58	37	7.50
Vol. 12, 1900	538 + xii	45	28	7.50
Vol. 13, 1901	583 + xii	58	47	7.50
Vol. 14, 1902	609 + xii	65	43	7.50
Vol. 15, 1903	636 + x	59	16	7.50
Vol. 16, 1904	636 + xii	94	74	7.50
Vol. 17, 1905	785 + xiv	84	96	7.50
Vol. 18, 1906	717 + xii	74	59	7.50
Vol. 19, 1907	617 + x	41	31	7.50
Vol. 20, 1908	749 + xiv	111	35	7.50
Index to volumes 11–20	422	..	..	3.50
Vol. 21, 1909	823 + xvi	51	109	7.50
Vol. 22, 1910	747 + xii	31	66	7.50

BROCHURES OF VOLUME 22

BROCHURES.	PAGES.	PLATES.	FIGURES.	PRICE TO FELLOWS.	PRICE TO THE PUBLIC.
Proceedings of the Twenty-third Annual Meeting of the Geological Society of America, held at Pittsburgh, Pennsylvania, December 27, 28, and 29, 1910. E. O. HOVEY, *Secretary*	1–84	1–6	....	$1.00	$1.50
Proceedings of the Second Annual Meeting of the Paleontological Society, held at Pittsburgh, Pennsylvania, December 28–29, 1910. R. S. BASSLER, *Secretary*	85–102	....	....	.20	.30
Origin of the thermal waters in the Yellowstone National Park. ARNOLD HAGUE	103–122	....	....	.20	.30
Repeating patterns in the relief and in the structure of the land. W. H. HOBBS	123–176	7–13	1–44	.75	1.10
Pre-Glacial course of the Upper Hudson River. W. J. MILLER	177–186	....	1	.10	.15
Aggraded limestone plains of the interior of Bahia and the climatic changes suggested by them. J. C. BRANNER	187–206	14–17	1–2	.30	.45
Aftonian mammalian fauna, II. SAMUEL CALVIN	207–216	18–24	....	.30	.45
*Conference on the faunal criteria in Paleozoic paleography. R. S. BASSLER, *Secretary*	217–280	....	....	.65	.90
Revision of the Paleozoic systems. E. O. ULRICH	281–680	25–29	1–19	4.15	6.20
Cirques and rock-cut terraces of Mount Toby. B. K. EMERSON	681–686	30–31	....	.10	.15
Mid-continental eolation. C. R. KEYES	687–714	....	....	.30	.45
Abstract of papers presented at the Twenty-third meeting of the Society, but not published in full in the preceding pages of this volume, together with discussions of papers as far as preserved. E. O. HOVEY, *Secretary*	715–738	....	....	.25	.35

IRREGULAR PUBLICATIONS

In the interest of exact bibliography, the Society takes cognizance of all publications issued wholly or in part under its auspices. Each author of a memoir receives 30 copies without cost, and is permitted to order any additional number at a slight advance on cost of paper and presswork; and these separate brochures are identical with those of the editions issued and distributed by the Society. Contributors to the proceedings are also authorized to order any number of separate copies of their papers at a slight advance on cost of paper and presswork; but such separates are bioliographically distinct from the brochures issued by the Society.

* Under the brochure heading is printed PROCEEDINGS OF THE PALEONTOLOGICAL SOCIETY.

The following separates of parts of volume 22 have been issued :

Editions uniform with the Brochures of the Society

Pages	85–102,	80	copies,	March	31, 1911.
"	103–122,	150	"	"	31, 1911.
"	123–176, plates 7–13,	130	"	May	10, 1911.
"	177–186,	60	"	"	22, 1911.
"	187–206, " 14–17,	180	"	"	23, 1911.
"	207–216, " 18–24,	130	"	June	14, 1911.
"	217–280,	155	"	"	23, 1911.
"	281–680, " 25–29,	80	"	August	31, 1911.
"	681–686, " 30–31,	150	"	December	7, 1911.
"	687–714,	30	"	"	14, 1911.

Special Editions†

Pages	4– 8, plate 1,	30	copies,	March	31, 1911.
"	8– 14,	30	"	"	31, 1911.
"	15– 19, " 2,	30	"	"	31, 1911.
"	19– 22, " 3,	30	"	"	31, 1911.
"	22– 32, " 4,	30	"	"	31, 1911.
"	32– 36, " 5,	30	"	"	31, 1911.
"	36– 47, " 6,	30	"	"	31, 1911.
"	48– 52,	30	"	"	31, 1911.
"	71– 84‡,	30	" covers,	"	31, 1911.
"	218–220‡,	80	" "	June	23, 1911.
"	221–227‡,	105	" "	"	23, 1911.
"	227–231‡,	30	" "	"	23, 1911.
"	231–237‡,	130	" "	"	23, 1911.
"	238–252‡,	100	" "	"	23, 1911.
"	252–257‡,	30	" "	"	23, 1911.
"	258–275‡,	280	" "	"	23, 1911.
"	275–278‡,	30	" "	"	23, 1911.
"	279–280‡,	30	" "	"	23, 1911.
"	720–721,	50	" "	December	15, 1911.
"	722–723,	50	" "	"	15, 1911.
"	725–726,	50	" "	"	15, 1911.
"	727–729,	50	" "	"	15, 1911.
Page	731,	50	" "	"	15, 1911.
Pages	732–733,	50	" "	"	15, 1911.
"	733–734,	50	" "	"	15, 1911.
Page	737,	50	" "	"	15, 1911.

†Bearing imprint [From Bull. Geol. Soc. Am., Vol. 22, 1911], and sometimes including fractional pages.

‡These separates bear upon the cover

PROCEEDINGS OF THE PALEONTOLOGICAL SOCIETY.

[Reprinted from the Bulletins of the Geological Society of America, vol. ——, pp. ——, pls. ——, (Date)]

CORRECTIONS AND INSERTIONS.

Although the usual requests for corrections and insertions were sent out to the contributors to Volume 22, no replies were received prior to going to press.

INDEX TO VOLUME 22

Page

ABICH, H.; A new island in the Caspian Sea, Reference to 147
AFTONIAN deposits, Area of 207
— fauna, Absence of carnivores in 209
— —, Fossilization and mode of preservation of 208
— fossils, Description of plates showing 216
— mammalian fauna, Edentates 215
— — —, Proboscideans (Elephas, Mastodon, etc.) 212-215
— — —, Rodents 215
— — —, II; Samuel Calvin 66, 207
— — —, Ungulates (horses, deer, camels) 210-212
AGASSIZ, LOUIS, quoted on vegetable refuse on the ocean bottom 222
ALASKA, Two glaciers in 66, 731
ALDEN, WILLIAM C.; Radiation in glacial flow as a factor in drumlin formation. (Abstract.) 66, 733
ALLANITE, Distribution in the Rocky Mountains of 122
AMENDMENT to the By-Laws, Life commutation 53
AMERICAN Philosophical Society, Reference to proceedings of 148
ANALYSES: Rhyolites from Yellowstone National Park, Table of 113
—: Waters of Yellowstone National Park 114
ANNUAL dinner of the Society 64
ARTHROPODS, The relation to the strand line of the Paleozoic; John M. Clarke 94, 279
ATWOOD, WALLACE W.; Physiographic studies in the San Juan district of Colorado. (Abstract.) 66, 735
AUDITING Committee, Election of 2
— —, Report of 62

BAGG, RUFUS M., JR.; Notes on a new method of calculating the date of the Glacial epoch. (Abstract.) 66, 735
BAHIA, Brazil, Geologic divisions of the State of 188
— limestone plains, Climate and climatic relations of 195-197
BARLOW, ALFRED E., Memoir of David Pearce Penhallow by 15
—; The geology of the Chibougaman region, Quebec, Canada. (Abstract.) 67, 738
BARRIERS and currents, The nature of Tertiary and modern marine faunal 93, 218
BARTON, GEORGE H., Memoir of William Harmon Niles by 8
BASSLER, R. S.; Ordovician and Silurian polar faunas (extempore) 92
—, Reference to studies of the Baltic bryozoa of 257
—, Secretary, Conference on the faunal criteria in Paleozoic paleogeography 217
—; The stratigraphic significance of Ostracoda 94, 275
BECK, R., Perfect fracture system in Saxon Switzerland shown by 159
BEECHER, C. E.; Revision of the families of loop-bearing Brachiopoda and development of *Terebratalia obsoleta* Dall, Reference to 258

Page

BELL, ROBERT, Memoir of Thomas Chesmer Weston by 32
—; Report on the geology of the French River district, Ontario, Reference to 150
BIBLIOGRAPHY: J. C. K. Laflamme 7
BIG HORN and Wind River basins, Eocene and Oligocene of 63, 722
— basin, Wyoming, The Lambdotherium zone in the 95
BLAKE, WILLIAM PHIPPS, Memoir of (with bibliography and portrait), by Rossiter W. Raymond 36
BLOCHMANN, ——, Reference to works on Brachiopods 253
BONNEY, ——, Quotation from his appendix to Darwin's "Structure and distribution of coral reefs" 251
BOWNOCKER, J. A., Memoir of William George Tight by 19
—; The Clinton sand as a source of oil in Ohio. (Abstract.) 67, 736
BRACHIOPODA, Genera of Mississippian loop-bearing; Stuart Weller 92
—, The stratigraphic significance of; Charles Schuchert 93, 258
BRACHIOPODS, Bathymetric range in general, inarticulata genera, articulata genera, and shell characters of deep-water species of .. 258-266
—, Geographic situation in general, distribution of the genera, deep-sea realm, boreal region, Oceanica, Gondwana, and equatorial Atlantic of recent 268-274
—, Geologic history of living 266-268
— of the Sea of and east coast of Japan, List of 269
—, Number and rank of recent 258
BRANNER, J. C.; Aggraded limestone plains of the interior of Bahia and the climatic changes suggested by them 187
—; The stone reefs of Brazil, etc., Reference to 197
BRAZIL east coast, Elevation during the Miocene of the 197
BRIGHAM, ALBERT PERRY, Study of the Pleistocene of the Broadalbin quadrangle of 185
—, The Mohawk glacial lobe ... 64, 183, 725
BRÖGGER, W. C., quoted on Norwegian coast region 145, 158, 167
BRYOZOA, Age, habits, and distribution of 252-257
—, Origination of 252
—, The relations to paleogeography of Paleozoic; E. O. Ulrich 93, 252
BUCKLEY, E. R.; On the building and ornamental stones of Wisconsin, Reference to 149
— quoted on the directions of joints ... 149
BUCKMAN, ——, Reference to Antarctic fossil Brachiopoda of 258
BULLETIN, Sales of, December 1, 1909, to November 30, 1910 57
BY-LAWS, Life commutation amendment to 53

CALVIN, SAMUEL; Aftonian mammalian fauna, II 66, 207
—; The Iowan drift. (Abstract.) .. 65, 729

Page

CAMBRIAN trilobites, Discovery of antennæ and other appendages of Middle 96
CAMEL from the Miocene of Nebraska, A new 95
CANADIAN Forestry School, Resolution relating to the late Monseigneur Laflamme and 62
CARNEGIE Institute, Complimentary "smoker" given by 55
— —, Vote of thanks to the Board of Trustees of 68
CARNEY, FRANK; Lake Maumee, in Ohio. (Abstract.) 65, 726
CARPENTER, FRANKLIN R., Memoir of (with bibliography), by H. O. Hofman 48
"CATINGA," Definition of 193
CATINGA limestone, Age of the 204
— —, An older 198
— limestones, Origin of 192, 203
CATTELL, J. MCKEEN, Conference papers of the First Annual Meeting of the Paleontological Society published in the Popular Science Monthly by. 87
CHADWICK, G. H., and H. L. FAIRCHILD; Iroquois and inferior waters in northern New York (extempore) ... 64
CHAZY formation in the Ottawa Valley, Paper read by Percy E. Raymond. (Abstract.) 62, 719
CHIBOUGAMAN region, Quebec, Canada, The geology of the; Alfred Ernest Barlow. (Abstract.) 67, 738
CIRQUES and rock-cut terraces, Mount Toby 681
CLAPP, FREDERICK G.; Notes on the geological relations of oil pools situated in regions of monoclinal structure. (Abstract.) 67, 737
CLARKE, JOHN M., Memoir of J. C. K. Laflamme by 4
— — — Robert Parr Whitfield by 22
—, retiring President of Paleontological Society, Reference to address of 53, 63, 92
—; The relation to the strand line of the Paleozoic arthropods 94, 279
CLARK'S composite analysis of 345 limestones, Reference to 191
CLIMATE of the Bahia limestone region. 195
CLINTON sand, A source of oil in Ohio 67, 736
COMMITTEE, Auditing 2, 62
CONTINENTAL (Mid-) Eolation; Charles R. Keyes 687
CORAL reef, Definition and origin of ... 238
— reefs (recent), Composition of 239
— — —, Character of bottom of 242
— — — — — the oceanic salts of 242
— — —, Depth of water and intensity of light of 239
— — —, Motion of the water about 242
— — —, specific gravity of the water of, Table of 243
— — —, Temperature of 241
— — (Paleozoic), Composition of the oceanic salts in 250
— — —, Cambrian, Ordovician, Silurian, Devonian, and Carboniferous 244-248
— — —, Character of the bottom of ... 250
— — —, Depth of water and intensity of light of 247
— — —, Gotland and Wisconsin Silurian 247
— — —, Grabau quoted on New York and Wisconsin 247
— — —, Movement of oceanic waters around 250

Page

CORAL reefs (recent), Specific gravity of the oceanic waters of 251
— — —, Temperature of 250
— —, Summary of conditions under which were formed Paleozoic and Recent 251
— —, The physical condition under which were formed, Paleozoic; T. Wayland Vaughan 93, 238
CORRESPONDENTS, Election of 3
— of the Society for 1911 72
COTYLEDONARY node of Cycadeoidea, The; G. R. Wieland 91
COUNCIL BLUFFS, Iowa, and Omaha, Nebraska, Pleistocene of the vicinity of 65, 730
—, Report of 56
CRANDALL and WILLIAMS, Report of, concerning Catinga limestone 202
CRETACEOUS and Tertiary formations of western North Dakota and eastern Montana (abstract); A. G. Leonard 63, 722
CUSHING, H. P.; Geology of Long Lake quadrangle, Reference to 152
—; Proposed modifications in the nomenclature of the early Paleozoic rocks of New York 62
CYCADEOIDEA, The cotyledonary node of 91

DARTON, N. H.; A list of underground temperatures in the United States (abstract), by 54, 716
—; Geology of part of Luna County, New Mexico (abstract), by 55, 718
—, Report of Photograph Committee by 52
DALL, WM. H., quoted on age of Catinga limestone 205
—, Reference to papers on Brachiopoda, 1870-1909, of 258
—; The nature of Tertiary and modern marine faunal barriers and currents 93, 218
DAUBRÉE, ——; Experimental geology, Reference to 140, 167
—, Reference to maps illustrating control of waterways by joints of 159
DAVIDSON, ——; A monograph of recent Brachiopoda, Reference to 258
DAVIS, W. M.; Geographical descriptions in the folios of the Geologic Atlas of the United States. (Abstract.) 66, 736
DEFLATION and aeroposition, Relations of areas of 702
— in dry regions, Authorities cited on. 696
DE LAUNAY, M.; Annales des Mines, Reference to 120
DELKESKAMP, RUDOLF, On sources of thermal waters 120
DERBY, O. A.; Age of Catinga limestone of Bahia 198
—; Limestone of the Silurian age at Bom Jesus da Lapa, Reference to. 188
DESERT occupation of the earth, Extent of 688
DIABASE, Apparent sun-crack structure in; Edgar T. Wherry. (Abstract.) 55, 718
DICERATHERIUM COOKI Peterson, A mounted skeleton in the Carnegie Museum of; O. A. Peterson 95
DINOSAUR from the Triassic of the Connecticut Valley, A new; Mignon Talbot 94
— quarry in Uintah County, Utah, The Carnegie; W. J. Holland 94
DITTMAR, W.; Mean table of seventy-seven analyses of ocean water 242

Page

DOLOMITES, Are the fossils of, indicative of shallow, highly saline, and warm seas? Stuart Weller..... 93, 227
DRAINAGE networks..... 133
DRIFT, The Iowan..... 65, 729
DRUMLIN formation, Radiation in glacial flow as factor in..... 66, 733
DRYGALSKI, E. VON; Greenland expedition, Reference to..... 133, 135
DUSTS from desert tracts, Disposition of..... 697

EARTHQUAKE, The great Japan, 1891... 173
— waves, The propagation of, by Harry Fielding Reid (read by title)..... 54
EDENTATES, Aftonian mammalian fauna 215
EDITOR'S report..... 60
ELECTION of officers, Fellows, etc..... 2
EMERSON, B. K.; Cirques and rock-cut terraces of Mount Toby..... 681
EOCENE and Oligocene of the Wind River and Big Horn basins; William J. Sinclair and Walter Granger. (Abstract.)..... 63, 722
— igneous rocks..... 104
EOLATION, Mid-Continental; Charles R. Keyes..... 54, 687-714
EOLIC continental deposits, Origin of... 695
— deposits, Authorities cited on... 697-699
— —, Characteristics of..... 699

FAIRCHILD, H. L., and G. H. CHADWICK; Iroquois and inferior waters in northern New York (extempore). 64
FARRINGTON, OLIVER C.; Quantitative classification of meteorites. (Abstract.)..... 67, 736
FAULT, Inherited conception of a..... 166
— maps, Difficulties in the way of securing..... 165
—, Neo Valley (Japan) earthquake.... 173
— system, Example of..... 168
—, The Baishiko, Formosa..... 173
FAULTS and joints comprised in one system..... 166
—, Deductions concerning the nature of 165
—, Evidence furnished from earthquake..... 173
—, Sudden changes of throw on..... 171
—, The nomenclature of by Harry Fielding Reid (read by title)..... 54
FAUNAS, On the derivation of Paleozoic..... 96
—, Ordovician and Silurian polar..... 92
FELLOWS deceased during year 1910.... 3
—, Election of..... 3
— of the Society deceased, Names of... 82
— — — — for 1911..... 72
FERN, A new generic type of fossil..... 91
FLORA of Alaska, Results of a preliminary Investigation of the Kenai; Arthur Hollick..... 91
FLORAL evidence in marine strata, The value of, as indicative of nearness of shores; David White..... 93, 221
FLUVIATILE hypothesis of origin of Great Plains deposits, Weakness of 711
FOSSIL fern, A new generic type of.... 91
— medusæ from Cambrian rocks of British Columbia; Charles D. Walcott..... 95
FOSSIL turtles accredited to the Judith River formation, Remarks on..... 95
FRACTURE fields, Disorderly..... 155
— — of North America, Controlled.... 148
— —, The correlation of..... 148
— — which exhibit control, European.. 158
— pattern of the earth's shell, The primary..... 163
— system model, A..... 171
— —, The African..... 162

Page

FRACTURE systems and planetary dislocations, Reference to transactions of the Wisconsin Academy of Science on..... 151
FRANKFORT and Utica (The) shales of the Mohawk Valley (abstract); Rudolf Ruedemann..... 63, 720
FREIGHT classification, Resolution concerning..... 91
FREIGHT rates, Resolution adopted concerning..... 53
FREW, W. N., Address of welcome given by..... 2
FUTTERER, KARL, Predominance of faults in southern Alps shown by.. 162

GARDINER, J. STANLEY; Fauna and geography of the Maldive and Laccadive archipelagoes, Reference to. 239
GEOLOGIC atlas of the United States, Geographic descriptions in the folios of the; W. M. Davis. (Abstract.)..... 66, 736
GEOLOGICAL Congress (International), Report of delegates to (oral)..... 62
— Nomenclature Committee, Report of. 53
GEYSER reservoirs, Temperature of underground..... 116
GIGANTOPTERIS Schenk, Its character and occurrence in America; David White..... 91
GILBERT, G. K.; Monograph I, U. S. Geological Survey, 1890, Reference to..... 165
—; Post-glacial joints, Reference to... 153
GLACIAL and Physiographic Section, Meeting of..... 64
— (The) epoch, Notes on a new method of calculating the date of the; Rufus M. Bagg, Jr..... 66, 735
— lake (New York), Warrensburgh.... 185
— lobe, The Mohawk..... 64, 183, 725
GLACIERS (Two) in Alaska (abstract); Lawrence Martin..... 66, 731
GOLDTHWAIT, JAMES WALTER; The twenty-foot terrace and sea-cliff of the lower Saint Lawrence. (Abstract.)..... 64, 723
GOOCH, F. A., and J. E. GOODRICH; Analyses of waters of Yellowstone National Park, Reference to..... 114
GRABAU, A., quoted on the Devonian reefs of Wisconsin and New York.. 247
GRANGER, WALTER, and WILLIAM J. SINCLAIR; Eocene and Oligocene of Wind River and Big Horn basins. (Abstract.)..... 63, 722
— — —; The Lambdotherium zone in the Big Horn basin, Wyoming..... 95
GRAPTOLITES, The stratigraphic significance of; Rudolf Ruedemann.. 93, 231
GREAT PLAINS, Dominant characteristics of the..... 689
— — fashioned mainly by eolative processes, Recapitulation showing. 713
— — features, Eolic significance of certain..... 703-710
— —, formations, Authorities supporting the lake hypotheses of..... 692
— — — — — various hypotheses of.... 692-695
GRIT, Facial relationships of the Shawangunk..... 55
GÜNTHER, A., quoted on the dislocation of Hiddensoe, Friedländer.... 159, 165

HAGUE, ARNOLD, Annual address of the President..... 103
—; Early Tertiary volcanoes of the Absaroka Range, Reference to..... 106

Page

HAGUE, ARNOLD: Origin of the thermal waters in the Yellowstone National Park 103
—, Reference to address of retiring President 55
—, Response to address of welcome by President 2
HALL, T. S., cited on graptolite horizons 234
HALL and CLARKE: An introduction to the study of Brachiopoda, Reference to 258
HALLOCK, W. H., Temperature of underground geyser reservoirs proved by 116
HARDER, E. C.; The joint system in the rocks of southwestern Wisconsin and its relation to the drainage network, Reference to 143
—; The Richland center district, Reference to 149
HARKNESS, ROBERT H., Reference to work on joint systems of 167
HAUGHTON, SAMUEL, Reference to work on joint systems of 167
HAYES, C. W., Deposits from aqueous solutions associated with igneous rocks described by 117
HEADLAM, E. J.; A new island in the Bay of Bengal, Reference to 147
HICE, RICHARD R.; An unusual distortion of the lower Kittanning coal. (Abstract.) 54, 716
HILL, ROBERT T.; Geology of the Sierra Almoloya, with notes on the tectonic history of the Mexican plateau, Reference to 155
HITCHCOCK, MRS. CHARLOTTE E., Reference to bird's-eye view of Mount Toby of 681
HJORT, JOHAN, quoted on depth of sunray penetration from article on "The *Michael Sars* North Atlantic Deep-Sea Expedition" 240
HOBBS, W. H.; Examples of joint controlled drainage from Wisconsin and New York, Reference to 143
—; On some principles of seismic geology, Reference to 146
— quoted on faults and joints of the Pomperaug Valley 167, 169
—; Repeating patterns in the relief and in the structure of the land 54, 123-176
—; The lineaments of the Atlantic border region, Reference to 144, 153
—; The river system of Connecticut, Reference to 155
—; Transactions of the Wisconsin Academy of Science, Reference to .. 148
HOBSON, B.; The volcanoes of Mexico, Reference to 154
HOFMAN, H. O., Memoir of Franklin R. Carpenter by 48
HOLLAND, W. J., Director Carnegie Museum, Invitation extended to the Paleontological Society by 86
—, Resolution concerning freight rates presented by 53
—, Special mention made of 68
—; The Carnegie Dinosaur quarry in Uintah County, Utah (extempore) . 94
—; The skull of *Moropus elatus* Marsh (extempore) 94
HOLLICK, ARTHUR; Results of a preliminary investigation of the Kenai flora of Alaska (read by F. H. Knowlton) 91
HOVEY, E. O., elected Secretary 2
—, Secretary Petrologic, Mineralogic, and Economic Section 67

Page

HUDSON River, Post-Glacial course of .. 179
— — (upper), Pre-Glacial course of the 64, 177-186
HUNTON formation, Oklahoma, The new stratigraphic units of the; Chester A. Reeds 92

ICE erosion, Influence of Hudson River and Lake George depression 182
— sheet erosion and deposition in the region of the Great Lakes, A study of; Frank Bursley Taylor. (Abstract.) 65, 727
IDDINGS, J. P.; A fracture valley system, Reference to 153
—; Geology of the Yellowstone National Park, Reference to 111
—, Studies of Yellowstone Park rhyolites by 111
— and WHITMAN CROSS, Distribution of allanite in the siliceous igneous rocks of the Rocky Mountains shown by 122
IGNEOUS rocks and thermal waters, Miocene 106
— — — — —, Pliocene 107
— —, Eocene 104
— — within Yellowstone Park, Absaroka Range and the Wind River plateau, Area of 104
IOWAN (The) drift (abstract); Samuel Calvin 65, 729
IROQUOIS and inferior waters in northern New York; H. L. Fairchild and G. H. Chadwick 64

JOINTS and faults comprised in one system 166

KEITH, ARTHUR, Secretary, Report on Geological Nomenclature Committee by 52
KEMP, JAMES F., The physiography of the Adirondacks, Reference to 180
—; The pre-Cambrian of Sweden, with comments on American taxonomic parallels. (Abstract.) 55, 719
—, Report of delegates to the International Geological Congress (oral) by 62
— and NEWLAND quoted on courses of Hudson, Schroon, and Sacandaga rivers 177
— — R. RUEDEMANN quoted on geology of Elizabethtown and Port Henry quadrangles 152
KENAI flora of Alaska; Arthur Hollick . 91
KEYES, CHARLES R.; Mid-Continental eolation, by 54, 687
KUNZ, GEORGE F.; The gem-bearing pegmatites of the world (read by title) 67
KITTANNING (Lower) coal, Unusual distortion of, by Richard R. Hice. (Abstract.) 54, 716
KJERULF, TH.; Geologie von Norwegen, Reference to 130, 140, 144, 145, 158
KNIGHT, CYRIL W., and WILLET G. MILLER; The pre-Cambrian of southeastern Ontario 55
KNOWLTON, F. H.; A new generic type of fossil fern from the American Tertiary 91
— quoted on Salitre limestones of Bahia 189
—; Remarks on the fossil turtles accredited to the Judith River formation 95
KERNERUP, A., Geologiska lagttagelser fra Vestkysten af Grönland, Reference to 131, 133

KREJCI, J., and K. FEISTMANTEL; The fault system of the Silurian basin in central Bohemia, Reference to.. 161

LABRADOR-NEWFOUNDLAND Paleozoic section, The..... 96
LACUSTRINE theory of Great Plains deposits, Objections to..... 710
LAFLAMME, J. C. K., Memoir of (with bibliography and portrait), by John M. Clarke..... 4
LAFLAMME, MONSEIGNEUR, Resolution relating to Canadian Forestry School and the late..... 62
LAKE George depression and eastward, Drainage of..... 180
— Maumee, in Ohio (abstract); Frank Carney..... 65, 726
LAMBDOTHERIUM zone in the Big Horn basin, Wyoming, The..... 95
LAMPLUGH, G. W.; The geology of the Zambesi basin around the Batoka gorge, Reference to..... 138
LAND, Repeating patterns in the relief and in the structure of, by William Herbert Hobbs..... 54, 123-176
LANDSCAPES, Character profiles in..... 124
—, Different orders of space units..... 128
—, Relief patterns in..... 124
—, Space units in profiles..... 127
LAWSON, A. C.; The geomorphogeny of the Tehachapi Valley system, Reference to..... 153
—; Twentieth Annual Report of the Geological and Natural History Survey of Minnesota, Reference to. 149
LEE, WILLIS THOMAS; Unconformity in the so-called Laramie of the Raton coal field of New Mexico. (Abstract.)..... 54, 717
LEONARD, A. G.; The Cretaceous and Tertiary formations of western North Dakota and eastern Montana. (Abstract.)..... 63, 722
LEPOX, L. R., Analysis of oölitic limestone from Carahyba, Bahia, by... 190
LIMESTONE from Carahyba, Bahia, Analysis of..... 190
— horizons of Bahia, The..... 188
— plains of the interior of Bahia and the climatic changes suggested by them, Aggraded..... 187
LIMESTONES of Bahia, Chrystalline, Salitre, Cretaceous, and Catinga... 189-191, 204
———, Old Catinga..... 201, 202
LINDE, J. G., Reference to studies on the joint system of..... 143
LINEAMENTS, Definition of..... 143
—, Relation to joints and faults..... 144
—, The varied expression of..... 143
LUNA County, New Mexico, Geology of part of; N. H. Darton. (Abstract.) 55, 718
LUZERNE River (New York), The..... 184

MCGEE, W J; Note on jointed structure, Reference to..... 151
MAMMALIAN fauna, II, Aftonian.... 66, 207
MARTIN, LAWRENCE; Two glaciers in Alaska. (Abstract.)..... 66, 731
MATTHES, F. E.; The lessons of the Little Yosemite Valley. (Abstract.) 65, 730
MATTHEW, G. F.; Movements of the earth's crust at Saint John, New Brunswick, in post-Glacial times, Reference to..... 165
MAUMEE Lake, Ohio; Frank Carney. (Abstract.)..... 65, 726
MEDUSÆ from Cambrian rocks of British Columbia, Fossil..... 95
MEMBERSHIP of the Society, Summary of the..... 34
MEMORIALS of deceased Fellows, 1910.. 4-52
MERRIAM, JOHN C., Authority to organize the Cordilleran Section of the Paleontological Society given to... 88
—, President American Society of Vertebrate Paleontologists, Official notice given of agreement to unite with the Paleontological Society by 87
MERRILL, GEORGE P.; The Moldavite question. (Abstract.)..... 67, 736
METEORITES, Quantitative classification of; Oliver C. Farrington. (Abstract.)..... 67, 736
MILLER, WILLET G.; The cobalt-nickel arsenides and silver deposits of Temiskaming, Reference to..... 148
— and CYRIL W. KNIGHT; The pre-Cambrian of southeastern Ontario. 55
MILLER, WILLIAM J.; Pre-Glacial course of the upper Hudson River. 64, 177-186
MILNE and BURTON; Photographs of Neo Valley (Japan) earthquake faults, Reference to..... 173
MIOCENE igneous rocks and thermal waters..... 106
— of Nebraska, A new camel from the. 95
MISSISSIPPI basin, A system of quaternary lakes in the..... 66, 732
—, Colorado, and Columbia rivers, The source of..... 104
MOHAWK glacial lobe; Albert Perry Brigham..... 64, 183, 725
MOJSISOVICS, EDMUND; Die Dolomit-Riffe von Südtirol und Venetien, Reference to..... 161
MOLDAVITE question, The; George P. Merrill. (Abstract.)..... 67, 736
MONTESSUS DE BALLORE, F. DE; La Science Séismologique, Reference to... 145
MOROPUS elatus Marsh, The skull of; W. J. Holland..... 94
MOUNT Toby, Cirques and rock-cut terraces of..... 681
———, Location of..... 681
MOUCHEZ, E.; Les côtes du Brésil, 3d ed., Reference to..... 197
MURRAY, SIR JOHN, quoted on marine temperature..... 241
———— the influence of temperature on the secretion of calcium carbonate by marine organisms..... 250
"MUTATIONS" of Waagen and "mutations" of De Vries, or rectigradations of Osborn compared; H. F. Osborn..... 96

NEWSOM, J. F., and J. C. BRANNER; The Red River and Clinton monoclines, Reference to..... 151
NILES, WILLIAM HARMON, Memoir of, by George H. Barton..... 8
NORTH AMERICA, Revision of Paleozoic system of (part II)..... 63, 289-680

OCEAN water, Mean of seventy-seven analyses of..... 242
OFFICERS, members, and correspondents of the Paleontological Society, 1911 97
— of the Society for 1911..... 71
OHERN, D. W.; The stratigraphy of the lower Pennsylvanian of northeastern Oklahoma. (Abstract.).... 63, 720
OIL in Ohio, The Clinton sand as a source of; J. A. Bownocker. (Abstract.)..... 67, 736

Page

OIL pools in regions of monoclinal structure, Notes on the geological relations of; Frederick G. Clapp. (Abstract.) 67, 737
OLDHAM, R. D.; Report on the great (Assam) earthquake of 1897, Reference to 174
OLIGOCENE and Eocene of the Wind River and Big Horn basins; William J. Sinclair and Walter Granger. (Abstract.) 63, 722
OMAHA, Nebraska, and Council Bluffs, Iowa, Pleistocene of the vicinity of. 65, 730
ORDOVICIAN and Silurian polar faunas; R. S. Bassler 92
ORES at the Veta Rica mine, Mexico, Occurrence of silver, copper, and lead; Frank R. Van Horn. (Abstract.) 67, 738
OSBORN, H. F.; "Mutations" of Waagen and "Mutations" of De Vries, or rectigradations of Osborn compared (read by title) 96
OSTRACODA, The stratigraphic significance of; R. S. Bassler 94, 275
OTTAWA Valley, Chazy formation in. 62, 719

PALEOGEOGRAPHY, Bearing of the Paleozoic Bryozoa on 93, 252
PALEOZOIC arthropods, The relation to the strandline of 94, 279
— Bryozoa, The relations to paleogeography of 93, 252
— continental seas, Extent of 304
— — —, Oscillatory character of 320
— faunas, On the derivation of 96
— nomenclature of stratigraphic units, Suggestions concerning 384
— rocks (early) of New York, Proposed modifications in the nomenclature of the; paper by H. P. Cushing... 62
— stratigraphic column, Development of the American 375
— system of North America, Revision of (part II); Edward O. Ulrich... 63, 289-680
— systems, Criteria and principles of stratigraphic classification in revision of the 394
— —, Diastrophic criteria of the 394
— —, Natural basis of geologic time divisions of 292
— —, Paleontologic criteria of the. 481-505
— —, Present instability in stratigraphic classification of 289
— —, Principles of stratigraphic correlations of the 505-574
— —, Revision of the 289-680
— —, Stratigraphic taxonomy of the.. 574-680
— —, Structural, gradational, and lithologic criteria of the 448-479
— time, Estimated length of 295
— —, Recurrence of species and fauna in 298
— —, "Shifting of faunas" and 295
PALEONTOLOGICAL Society, Auditors appointed 89
— —, Correspondents nominated for election to the 88
— —, Election of officers, correspondents, and list of members 89
— —, Members deceased, 1910, ... 88, 101
— —, Members-elect, December 31, 1910 103
— —, Members proposed for election to fellowship in the Geological Society of America by the 88
— —, Memorial addresses for deceased members 91

Page

PALEONTOLOGICAL Society, Officers, members, and correspondents, 1911 97
— —, Plan of publication of papers of. 86
— —, Proceedings of 85
— —, Register of the Pittsburgh Meeting, 1910 96
— —, Treasurer's report 89
PASSARGE, SIEGFRIED; Die Kalihari, Reference to 162
PATTON, H. B., chairman Petrologic, Mineralogic, and Economic Section. 67
PEGMATITES, The gem-bearing of the world; George F. Kunz 67
PENHALLOW, DAVID PEARCE, Memoir of (with bibliography and portrait), by Alfred E. Barlow 15
PENNSYLVANIAN (Lower) of northeastern Oklahoma, Stratigraphy of. (Abstract.) 63, 720
PERMIAN of New Mexico, A complete skeleton of a new group of large reptiles from the 95
— — Texas, A mounted skeleton of Varanosaurus from the 95
PETERSON, O. A.; A mounted skeleton of *Dicratherium cooki* Peterson in the Carnegie Museum (extempore). 95
—; A new camel from the Miocene of Nebraska (extempore) 95
PETROLOGIC, Mineralogic, and Economic Section, Organization of the 67
PFAEFFERS, in the Tyrol, Vadose origin of the mineral waters of 120
PHILLIPS, F. C.; Gases from Yellowstone thermal springs, Analysis by. 117
PHILLIPS, JOHN, Reference to work on joint systems of 107
PHOTOGRAPH Committee, Report of 52
PHYSIOGRAPHIC and Glacial Section, Meeting of 64
PIRSSON, L. V.; Crustal warping in the Temagami-Temiskaming district, Ontario, Reference to 148
PITTSBURGH, Pennsylvania, Proceedings of the Twenty-third Annual Meeting of the Geological Society of America, held December 27, 28, and 29, 1910, at 1
—, Sketch of the local geology of the city of (abstract); Percy E. Raymond 63, 721
PLAINS formations, Explanations of.... 690
PLEISTOCENE of the vicinity of Omaha, Nebraska, and Council Bluffs, Iowa (abstract); B. Shimek 65, 730
— — — — — Sioux Falls, South Dakota (abstract); B. Shimek 65, 730
— Igneous rocks and thermal waters... 106
POMPERAUG Valley system of Connecticut, Fracture fields in 155, 167
— —, The Newark system of the, Reference to 131
POPULAR Science Monthly, Conference papers of the First Annual Meeting of the Paleontological Society published in the 87
PRE-CAMBRIAN (The) of southeastern Ontario, Paper by Willet G. Miller and Cyril W. Knight on 55
— — — Sweden, and American taxonomic parallels, Paper by James J. Kemp on. (Abstract.) 55, 719
PRE-GLACIAL course of the upper Hudson River; William J. Miller 64, 177-186
PROBOSCIDEANS, Aftonian mammalian fauna 212
PROCEEDINGS of the Second Annual Meeting of the Paleontological Society, held at Pittsburgh, Pennsyl-

Page

vania, December 28-29, 1910; Ray Smith Bassler, Secretary..... 85-102
PROCEEDINGS of the Twenty-third Annual Meeting of the Geological Society of America, held at Pittsburgh, Pennsylvania, December 27, 28, and 29, 1910; Edmund Otis Hovey, Secretary..... 1-84

QUATERNARY lakes in the Mississippi basin, A system of (abstract); E. B. Shaw..... 66, 732

RADIATION in glacial flow as a factor in Drumlin formation (abstract); William C. Alden..... 66, 733
RANSOME, EMMONS (W. H.), and GARRY; Geology and ore deposits of the Bullfrog district, Nevada, Reference to..... 154
RATON coal field, New Mexico, Unconformity in the so-called Laramie of the, by Willis Thomas Lee. (Abstract.)..... 54, 717
RAYMOND, PERCY E.; Sketch of the local geology, city of Pittsburgh. (Abstract.)..... 63, 721
—; The Chazy formation in the Ottawa Valley, by. (Abstract.)..... 62, 719
RAYMOND, ROSSITER W., Memoir of William Phipps Blake by..... 36
REEDS, CHESTER A.; The new stratigraphic units of the Hunton formation (extempore)..... 92
REID, HARRY FIELDING; The nomenclature of faults (read by title)..... 54
—; The propagation of earthquake waves (read by title)..... 54
REGELMANN, C., Reference to fracture map of southwest Germany of.... 160
REGISTER of the Pittsburgh meeting, 1910..... 69
— — — — — of the Paleontological Society, 1910..... 96
REPTILES from the Permian of New Mexico, A complete skeleton of a new group of large..... 95
REPORT of Auditing Committee..... 62
— — Council..... 56
— — Editor..... 60
— — Secretary..... 56
— — — of the Paleontological Society. 85
— — Treasurer..... 58
— — — of the Paleontological Society. 80
RHYOLITE, Mineral and chemical composition of..... 112
—, Physical structure of..... 110
RHYOLITES belong to the Pliocene age. 108
— from Yellowstone National Park, Table of analyses of..... 113
— in Yellowstone Park region, Thickness of..... 108
RIO JACARÉ and Rio Verde valleys, Bahia, Limestones of..... 196
RIVER channels of limestone region of Bahia, Size and character of abandoned..... 197
RODENTS, Aftonian mammalian fauna.. 215
ROTHPLETZ, A., quoted on Salitre limestones of Bahia..... 190
RUEDEMANN, RUDOLF; The Frankfort and Utica shales of the Mohawk Valley. (Abstract.)..... 63, 720
—; The stratigraphic significance of graptolites..... 93, 231
RUSSELL, I. C.; Geological history of Lake Lahontan, Reference to..... 153
—; Monograph XI, U. S. Geological Survey, 1885, Reference to..... 165

Page

SACANDAGA River (New York), The.... 184
SALITRE Valley, Bahia, Catinga limestones of..... 191
SALOMON, WILHELM, quoted on hydrographic system of the Alps and the Tyrol..... 161
SAMPAIO, THEODORE F., Age of Catinga limestone of Bahia..... 198
SAN JUAN district of Colorado, Physiographic studies in the (abstract); Wallace W. Atwood..... 66, 735
SCHLUNDT, HERMAN, and R. B. MOORE quoted on the radioactivity of thermal waters of the Yellowstone National Park..... 121
SCHUCHERT, CHARLES; A synopsis of American Brachiopoda, Reference to..... 258
—, Conference on the criteria in Paleogeography proposed by..... 88, 217
—; The Labrador-Newfoundland Paleozoic section (read by title)..... 96
— — stratigraphic significance of Brachiopoda..... 93, 258
SECRETARY'S Report..... 56
— —, Paleontological Society..... 85
SEISMOTECTONIC lines, Character of.... 146
SHALER, N. S.; Spacing of rivers, with reference to hypothesis of base-leveling, Reference to..... 127
SHAWANGUNK grit (The) and its facial relationships; Gilbert Van Ingen (extempore)..... 55
SHAW, E. B.; A system of quaternary lakes in the Mississippi basin. (Abstract.)..... 66, 732
SHIMEK, B., Reference to field work on Aftonian gravels of..... 207
—; The Pleistocene of the vicinity of Omaha, Nebraska, and Council Bluffs, Iowa. (Abstract.)..... 65, 730
— — — — — — — Sioux Falls, South Dakota. (Abstract.)..... 65, 730
SAINT LAWRENCE (Lower), The twenty-foot terrace and sea-cliff of the; James Walter Goldthwait. (Abstract.)..... 64, 723
SIMMER, HANS, quoted on direction of fracture lines in Africa..... 162
SINCLAIR, WILLIAM J., and WALTER GRANGER; Eocene and Oligocene of Wind River and Big Horn basins. (Abstract.)..... 63, 722
— — —; The Lambdotherium zone in the Big Horn basin, Wyoming.... 95
SIOUX FALLS, South Dakota, The Pleistocene of the vicinity of..... 65, 730
SJÖGREN, OTTO, Reference to studies on Abisko Canyon, in Swedish Lapland..... 145
SPURR, J. E.; Origin and structure of the basin ranges, Reference to.... 153
— quoted on "chief faults" of the basin ranges of Nevada and California.. 153
STONY Creek divide, Cause of passage of the Hudson (River) over the... 183
STRATIGRAPHY of the Lower Pennsylvanian of northeastern Oklahoma (abstract); D. W. Ohern..... 63, 720
STRUTT, R. J.; On the distribution of radium in the earth's crust and on the earth's internal heat, Reference to..... 122
STUR, DIOMYS; Dominance of the diagonal and meridional directions of drainage, controlled by fractures, shown by..... 162

Page

TARR and MARTIN; Recent changes of level in the Yakutat Bay region, Alaska, Reference to..... 174
TALBOT, MIGNON; A new Dinosaur from the Triassic of the Connecticut Valley (extempore)..... 94
TAYLOR, FRANK BURSLEY; A study of ice-sheet erosion and deposition in the region of the Great Lakes (extempore, with maps and abstract) 65, 727
TAXONOMIC parallels (American), The pre-Cambrian of Sweden, with comments on..... 55, 719
TERRACES of Mount Toby, Cirques and rock-cut..... 681
TERTIARY and Cretaceous formations of western North Dakota and eastern Montana (abstract); A. G. Leonard..... 63, 722
— — modern marine faunal barriers and currents, The nature of; W. H. Dall..... 93, 218
THERMAL activity in Yellowstone region, Duration of..... 108
"THERMAL Springs," by Arnold Hague, Reference to..... 104
— — of Yellowstone Park, Classification and composition of..... 114
THORODDSEN, TH.; Lysing Islands, Reference to..... 129
THORKELSSON, THORKELL; "The hot springs of Iceland," Reference to.. 120
"THROUGH Valley," Illustration of..... 179
TIGHT, WILLIAM GEORGE, Memoir of (with bibliography and portrait), by J. A. Bownocker..... 19
TOPOGRAPHIC maps, Relief patterns in.. 129
— —, The primary unit of the subdivision in..... 131
TOPOGRAPHY, Checkerboard..... 129, 152
—, Typical fault..... 125
— — fold 126
TRAVERTINE and siliceous sinter, Vegetation of hot springs the formation of..... 116
— of Mammoth Hot Springs, Oldest deposit of..... 108
TREASURER'S report..... 58
— — of the Paleontological Society.... 89
TRILOBITES, Discovery of antennæ and other appendages of Middle Cambrian..... 96
TURTLES accredited to the Judith River formation, Remarks on the fossil.. 95

ULRICH, E. O.; On the derivation of Paleozoic faunas (read by title)... 96
— quoted on the distribution of Graptolite faunas..... 236
—; Revision of the Paleozoic systems of North America..... 63, 289-680
—; The relations of Paleozoic bryozoa to paleogeography..... 93, 252
UNDERGROUND temperatures in the United States; presented without manuscript by N. H. Darton... 54, 716
UNGULATES, Aftonian mammalian fauna 210
UNITED STATES Geological Survey, Analyses of rhyolite made by..... 112
UTICA and Frankfort (The) shales of the Mohawk Valley (abstract); Rudolf Ruedemann..... 63, 720

VAN HISE, C. R.; The origin of the dells of the Wisconsin, Reference to 145
VAN HORN, FRANK R.; The occurrence of silver, copper, and lead ores at the Veta Rica mine, Sierra Mojada, Coahuila, Mexico. (Abstract.) 67, 738

Page

VAN INGEN, GILBERT; Attention called to action of Pennsylvania Railroad requiring permission for geologic work by..... 91
—; The Shawangunk grit and its facial relationships (extempore)..... 55
VARANOSAURUS from the Permian of Texas, A mounted skeleton of..... 95
VAUGHAN, T. WAYLAND; The physical conditions under which Paleozoic coral reefs were formed..... 93, 238
VERTEBRATE Paleontologists (American Society of), Amalgamation with the Paleontological Society of..... 87
VERTEBRATES, The paleogeographic significance in Paleozoic strata of land; S. W. Williston..... 94
VETA Rica mine, Sierra Mojada, Coahuila, Mexico, Occurrence of silver, copper, and lead ores at the... 67, 738
VOLCANIC vents, The mesh-like arrangement of..... 148
VOSS, E. L., cited on aridity of Ceara, Brazil..... 206

WALCOTT, CHARLES D.; Discovery of antennæ and other appendages of Middle Cambrian trilobites (extempore)..... 96
—; Fossil medusæ from Cambrian rocks of British Columbia (extempore).. 95
— quoted on the *Archæocyathinæ*..... 246
WALTHER, ——; Origin and peopling of the deep sea, Reference to..... 267
WEED, WALTER H.; Formation of travertine and siliceous sinter by the vegetation of hot springs, Reference to..... 116
WELLER, STUART; Are the fossils of dolomites indicative of shallow, highly saline, and warm seas?. 93, 227
—; Genera of Mississippian loop-bearing brachiopoda..... 92
— and T. W. STANTON, Auditors appointed for the Paleontological Society..... 89
WESTON, THOMAS CHESMER, Memoir of (with portrait), by Robert Bell.... 32
WETHERED, EDWARD B., quoted on Carahyba rock of Bahia..... 190
WHITE, DAVID; *Gigantopteris* Schenk, its character and occurrence in America..... 91
WHITE, C. A.; Paleontology of Brazil, Reference to..... 191
WHITE, DAVID; The value of floral evidence in marine strata as evidence of nearness of shores..... 93, 221
WHITFIELD, ROBERT PARR, Memoir of (with bibliography and portrait), by John M. Clarke..... 22
WIELAND, G. R.; The cotyledonary node of Cycadeoidea (extempore)..... 91
WILLIAMS, H. S., R. S. TARR, and E. M. KINDLE; Geologic atlas of the United States, Watkins Glen-Catatonk folio (field edition), Reference to..... 152
WILLIAMS, H. E., quoted on limestone bluffs near Rio Salitre Falls, Bahia 194
WILLIS, BAILEY, Reference to symposium of outlines of geologic history, with especial reference to North America, of..... 246
WILLISTON, S. W.; A complete skeleton of a new group of large reptiles from the Permian of New Mexico (extempore)..... 95

Page

WILLISTON, S. W.; A mounted skeleton of Varanosaurus from the Permian of Texas (extempore) 95
—; The paleogeographic significance of land vertebrates in Paleozoic strata 94
WILSON, A. W. G.; Trent River system and Saint Lawrence outlet, Reference to 150
WINCHELL's "diagonal system," Reference to 148
WINCHELL, A.; The diagonal system in the physical features of Michigan, Reference to 140
WIND River and Big Horn basins, Eocene and oligocene of 63, 722
— scour and its effects, Various authorities cited on 693
WOODWORTH, J. B.; Post-Glacial faults of eastern New York, Reference to. 165
WRIGHT, G. F., Reference to his paper on the post-Glacial course of the Hudson River 179

YATSU, ——; Notes on the histology of *Lingula anatina*, Habits of the Japanese Lingula, Reference to 258

Page

YELLOWSTONE National Park, Classification and composition of thermal springs of 114
— — —, Number of springs in 114
— — —, Origin of the thermal waters in the 103
— — —, Radioactivity of thermal waters of 121
— — — springs and geysers, Development of 118
— — —, Summary of the origin of the thermal waters in the 122
— — — thermal springs, Gases from .. 117
— Park region, Climatic conditions of .. 109
— — —, Lakes and bodies of water in. 110
— — —, Periods of time indicated in the 104
YOSEMITE (The little) Valley, The lessons of the (abstract); F. E. Matthes 65, 730

ZOOLOGICAL nomenclature, Committee appointed on 90
— —, Resolution concerning 90